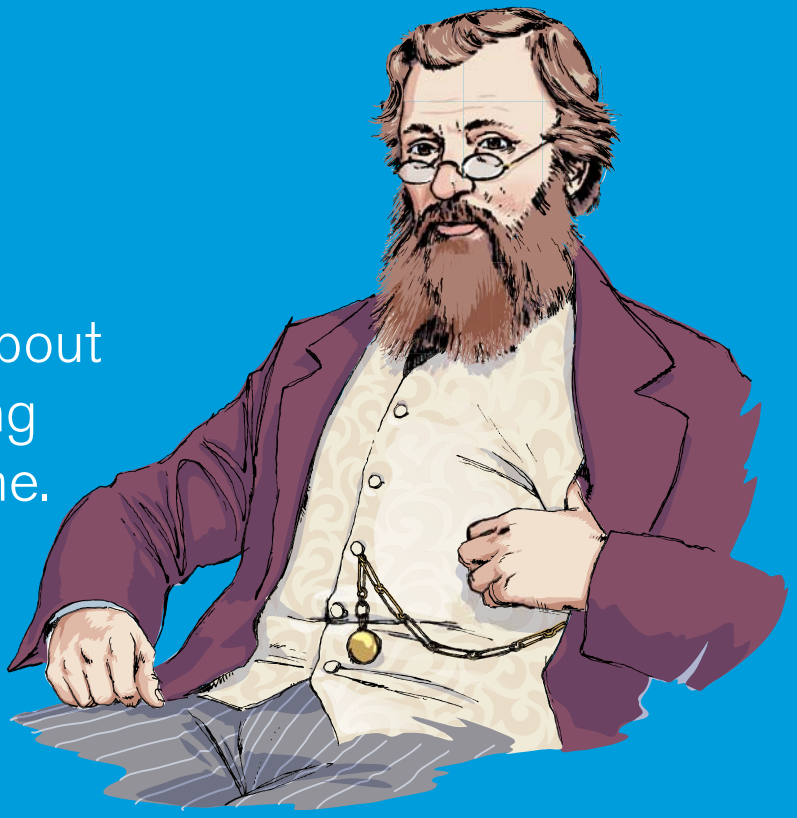
Mr Clark's Lift

This book will tell you more about the Anderton area and building a boat lift in Edwin Clark's time.



ANDERTON BOAT LIFT

The 1875 Anderton Boat Lift

Anderton Boat Lift timeline

Trade was booming and industrialists needed ways to move cargoes between the river and canal.
Edward Leader Williams eventually commissioned Edwin Clark to build a hydraulic boat lift between the two waterways.

1721 The River Weaver was made navigable

1777 The Trent & Mersey Canal opened

1875 Edwin Clark's hydraulic boat lift opened

1896 The aqueduct gates were electrified

1881 Trade was steadily increasing

1882 A serious accident closed the lift for six months

1882 Grooves on the hydraulic rams were first noticed

1886 Tolls were dropped and the lift were made free for boats using the river navigation

1887 John Arthur Saner became engineer to the Weaver Navigation Trust

1895 Boats travelling through the lift increased due to the Canal Tolls & Charges Act

1902 Some manual tasks on the lift were changed to electric operation

1904 Colonel Saner reported problems and proposed a new design

1906 Traffic through the hydraulic boat lift reached a peak

1908 Saner's electric lift was opened

1922 Extensive repairs were made to the lift due to corrosion of metalwork

1929 A downward trend in traffic began as cargoes moved to roads

1934 Colonel Saner retired from the Weaver Navigation Trust

1939 The Home Guard kept watch on the lift as a potential German target

1941 The hydraulic rams were removed to provide ironwork for the war effort

1944 The first of a series of incidents caused damage to the lift

1946 High water levels on the River Weaver caused flooding

1949 The waterways were nationalised under the British Transport Commission

1962 The lift was now transferred to the new British Waterways Board

1964 Working practices changed; the River Weaver staff now worked on canals too

1976 The Anderton Boat Lift was listed as a Scheduled Monument

1983 The lift was no longer safe to operate and it was closed

1983 Four options for restoration were considered

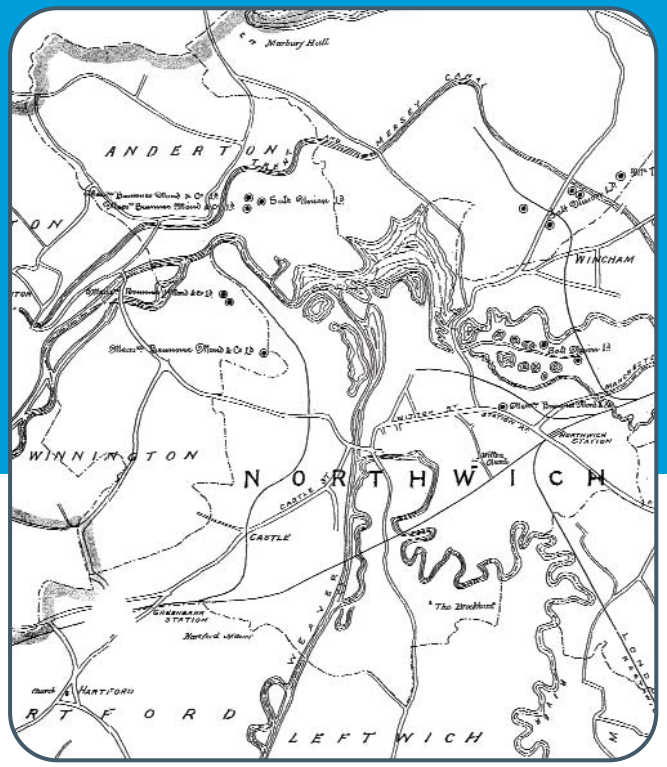
1992 Full restoration to the 1908 design was investigated

1998 The restored lift would be hydraulic but many of the 1908 features would be refurbished and kept in place

1999 The Heritage Lottery Fund committed £3.3million to the restoration

2002 The lift was restored and opened to visitors

Courtesy of Cheshire County Records Office, Chester



A map of the Northwich area c1870 showing the main salt works, the River Weaver and the Trent & Mersey Canal.

Navigations boosted trade

Local industry continued to press for better transport links to support the growth of trade. River and canal navigations were responsible for big changes.

The Weaver Navigation

Before the construction of the Weaver Navigation, pack horses laboriously carried 200lb loads to the River Mersey for shipping. Sailing boats called Weaver Flats that worked the river could carry 35 tons at a time!

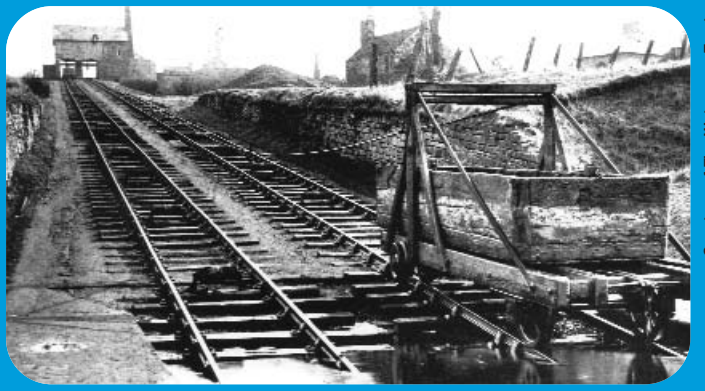
The River Weaver was made navigable in 1721 mainly because of pressure from salt proprietors in Cheshire and salt merchants in Liverpool. It became a profitable trade route, transporting salt and cheese as well as other goods from towns along the river.

The Trent & Mersey Canal

In 1777, the Trent & Mersey Canal was built to connect the Potteries to the port of Liverpool in the west and to Newark and the River Trent to the east. The Weaver Navigation Trustees had opposed the construction of the canal as they were afraid that it would take trade from the prosperous Weaver Navigation.

Courtesy of The Salt Museum, Northwich

Weaver flats loading at the British Salt Company's salt chutes on the River Weaver by JF Drinkwater 1856.



Courtesy of The Waterways Trust, The National Waterways Museum (Gloucester)

The Anderton inclines, though smaller, would have been similar to the Wombridge or Trench Incline on the tub-boat section of the Shrewsbury Canal.

Salt chutes and inclined planes

However, it was not long before local salt manufacturers were looking at ways of linking the two waterways.

Salt operators needed a quick way of getting salt down onto the Weaver Navigation from their works. Archaeological surveys have found evidence of salt chutes built at Anderton dating back to the early 1800s.

Inclined planes were another means of taking goods down to the river and hauling them back up. By 1872 there were four salt chutes and four inclined planes at Anderton.

Siting of the lift

The Trustees eventually recognised that a boat lift would increase trade by allowing the movement of cargoes like pottery that couldn't go down the chutes.

The site selected for the lift was a small island created by the gradual development of Anderton Basin. The lift would be mid way between the River Weaver and the Trent & Mersey Canal, which were separated by a distance of 400ft and a height of 50ft.

Courtesy of Cheshire Record Office, Cheshire, Crown Copyright reserved.

The site chosen for the Anderton Boat Lift.

Who built the 1875 Boat Lift?

Our Engineer having explained the working of the proposed lift for the transhipment of traffic at Anderton… we are of the opinion that this should be referred to the Anderton Committee'

Entry in the Weaver Minute Book July 1870

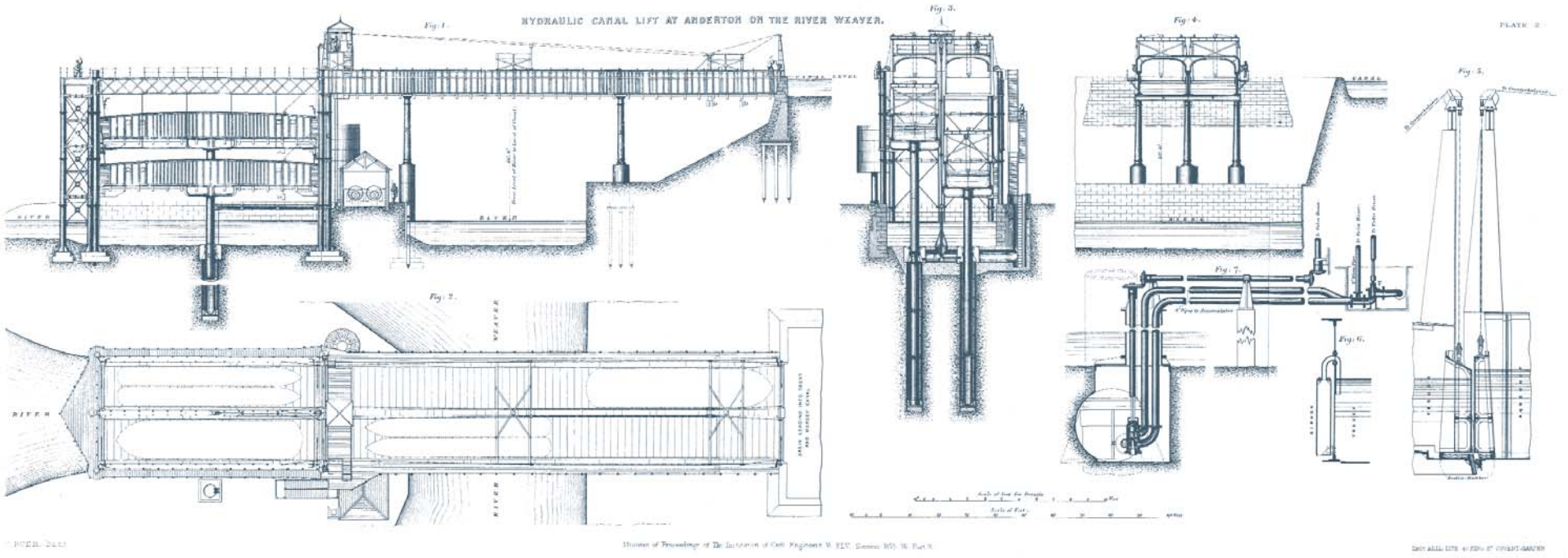
Courtesy of the Manchester Ship Canal Company at Greater Manchester County Record Office

Edward Leader Williams, engineer to the Weaver Navigation Trust.

Top man on the job

Edward Leader Williams was engineer to the Trust from 1856 to 1872.

In a report to the Trustees considering how to link the two waterways, he investigated locks and inclined planes but advocated the building of a boat lift. At last recognising the potential to increase trade on the Weaver Navigation they instructed him to look at designs for a boat lift.



Courtesy of the Institute of Civil Engineers

Engineering drawings of Edwin Clark's design for the Anderton Boat Lift

A modern hydraulic boat lift

Boat lifts were not a new idea. Although other lifts could carry boats of eight to ten tons, the largest boats to use the River Weaver weighed 60 tons when loaded and the new boat lift would need to raise boats by 50ft.

During his investigations, Leader Williams was persuaded by Edwin Clark to make a visit to the Victoria Graving Dock in London.

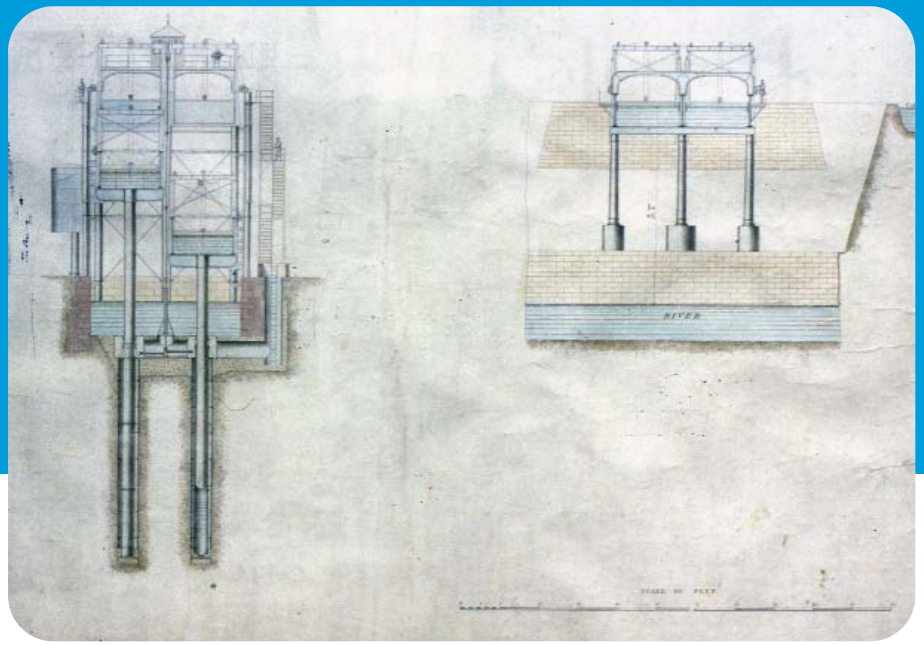
This hydraulic dock designed by Clark lifted boats clear of the water for maintenance purposes. Amazingly, it could lift ships of 2,000 tons in weight!

An established reputation

The main designer of the lift was Edwin Clark, supported by a team of engineers. Clark had gained engineering experience working for Robert Stephenson as designer on the Britannia Bridge across the Menai Straits. His particular specialism was in the design of electrical and hydraulic machinery.

By 1870 Clark was the leading partner of Clark, Standfield and Clark, a London based consultancy and had established a reputation as a designer of hydraulic machinery.

Courtesy of Tony Hirst



An early drawing of the design for the Boat Lift

A major undertaking

Even with modern equipment, building the lift today would be a substantial project.

Design options and challenges

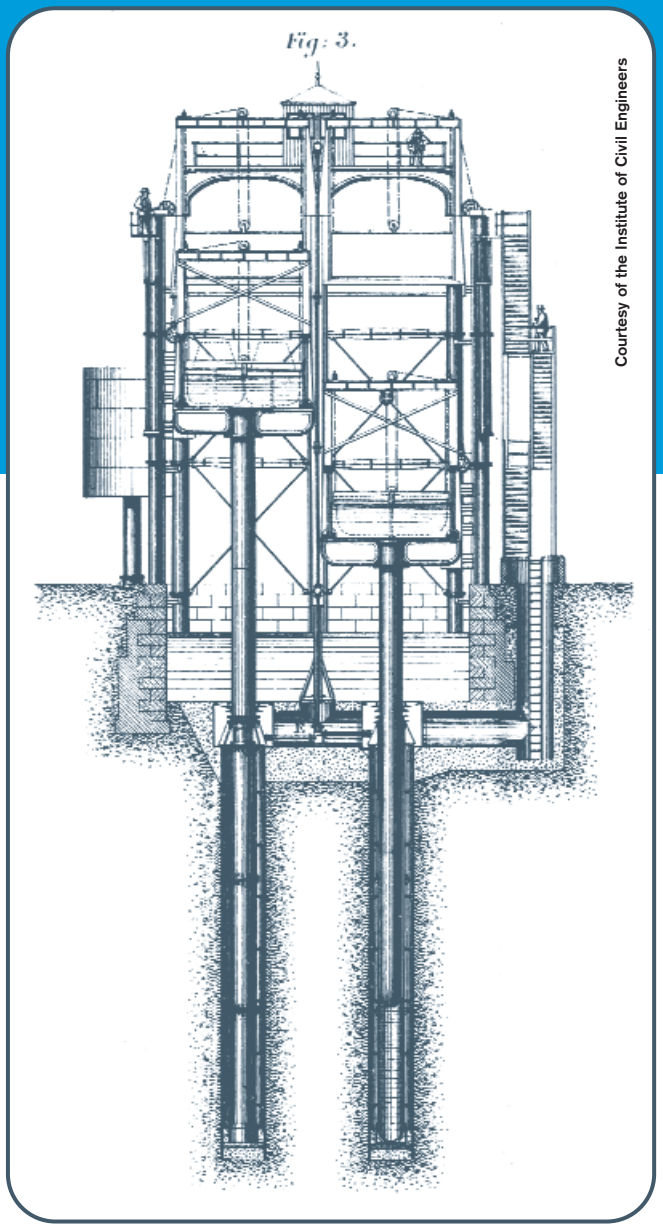
Having decided to build a lift, the solution held plenty of challenges for its designers.

To avoid the need for a large steam engine to raise a single caisson, the engineers decided to use two caissons to counter balance each other. By adding water into the descending one to make it heavier, nearly all of the work to raise the other caisson would be done by the one desending. A much smaller steam engine could raise the caisson the last few feet.

Another design challenge was how to fit the hydraulic rams. The idea of fitting two rams, one at each end of a caisson, was considered. But the engineers were concerned that it would be difficult to make sure that the rams were completely level.

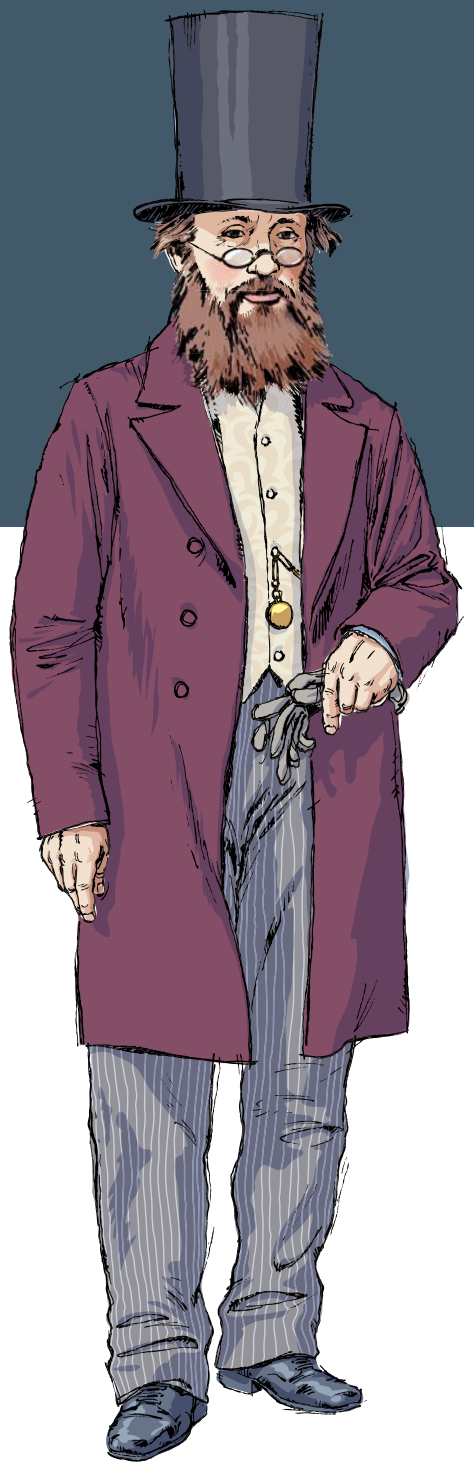
If one was shorter than the other, water would move to one end of the caisson, putting strain onto the shorter ram. The decision was made to use a single 3ft diameter ram positioned centrally under each caisson.

The Trustees must have been alarmed when in 1872, Leader Williams handed in his resignation shortly after Royal Assent was given for the building of the lift. He was to take up a new post as engineer to the nearby Bridgwater Canal Company although he agreed to stay as consulting engineer whilst the lift was built.



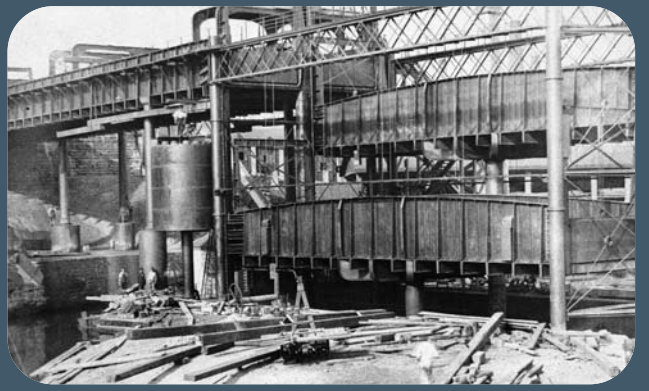
Courtesy of the Institute of Civil Engineers

Two caissons would counter balance each other and each caisson would be supported by a single hydraulic ram.



Courtesy of the Salt Museum, Northwich

There were severe problems with subsidence in Northwich.



Courtesy of the Merseyside Maritime Museum.

The 1875 boat lift during its construction.

Alarm amongst the Trustees

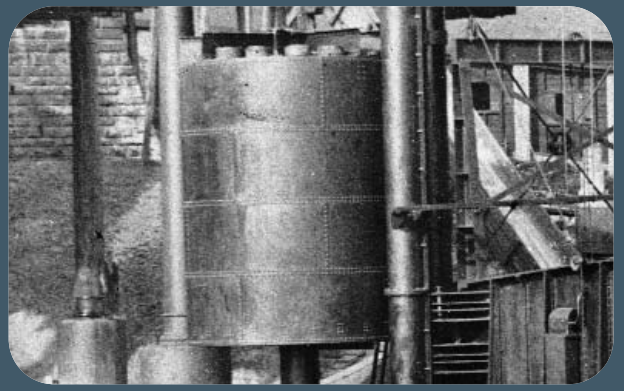
Sidengham Duer was appointed as the resident engineer during the construction of the lift and the new engineer to the Trust, Mr Sandeman supervised the works.

Soon after awarding the contract to build the lift to Emmerson Murgatroyd & Co, Mr Sandeman made changes to the design, strengthening the foundations. The collapse of underground caverns created by many years of brine pumping had caused severe subsidence in Northwich and the surrounding villages. It was important that the lift was on solid ground.

Building the boat lift

The making of all the ironwork, and construction of the lift on site took about 30 months. Temporary timber scaffolding was put up and hoists and fixed cranes were erected.

The lift's cast and wrought iron parts were made at Emmerson Murgatroyd & Co's yard at Stockport. Larger parts were probably made in Liverpool and brought to site via the River Mersey and the Weaver Navigation.



Courtesy of the Merseyside Maritime Museum.

The accumulator was used to store hydraulic energy.

Courtesy of The Waterways Trust/ The Waterways Archive (Ellesmere Port)

The 1875 boat lift shortly after construction.

Early design modifications

The Weaver Trustee's own workforce were sub-contracted to help with the ground works. Foundations for the cast iron cylinders, which contained the lifting rams were dug out by hand to a depth of 70ft.

A new canal basin was built and a puddle clay bottom kept the bottom of the basin watertight. Costs over ran mainly because of the need to strengthen the foundations and the ironwork. But the lift was hailed as a great success. The 1875 structure was admired for its elegant simplicity.

Design details

An aqueduct provided access from the Trent & Mersey Canal and consisted of two cast iron channels level with the caissons on the lift structure.

Each end of the aqueduct could be closed off with vertical-lift wrought iron gates. They were counter-weighted to make operation by hand easier. Rubber seals made all the joints watertight in between the caissons and the aqueduct. A gantry over the aqueduct supported a small wooden operating hut. From here, the operator could open and close the various valves to raise and lower the caissons. Walkways and a staircase provided access to all parts of the lift.

The lift chamber could hold two caissons side by side. These in turn could each hold two narrowboats of 72ft long by 6ft 6inches wide or a single barge about 13ft wide. At each end of the caisson was a hand-operated gate which was raised or lowered to let boats in and out.

Each caisson was supported centrally by a massive hydraulic ram sunk 50ft into the ground below the lift. The pistons or moving parts of the rams passed through a dry access tunnel about 4ft in diameter so that workmen could adjust or lubricate the moving parts.

The vertical movement of the caissons was guided at each corner by cast iron columns. There was another column at the river end to support a high level working platform and give the structure additional stability. The accumulator, which was a means of storing hydraulic energy, was installed below the lift. It was kept continually ready for use by a coal fired steam engine housed in a brick building to the east of the aqueduct.

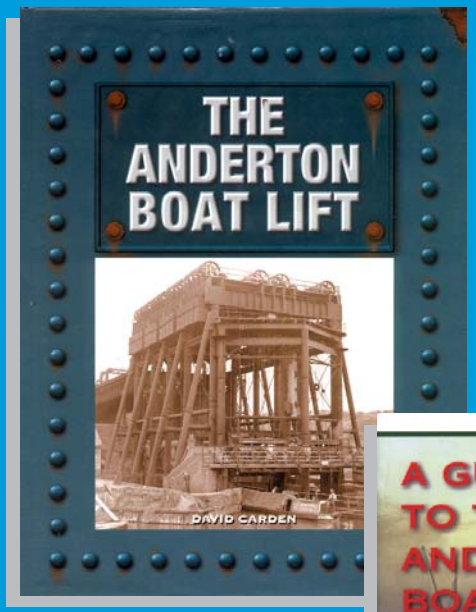
Find out more!

Visit the Anderton Boat Lift Shop on the upper floor for souvenirs and gifts.

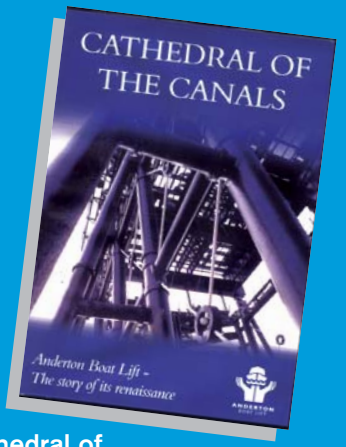
You can pick up a copy of the well illustrated souvenir guide book.

If you want to find out more about the restoration in 2002, the film, Cathedral of the Canals is great to watch.

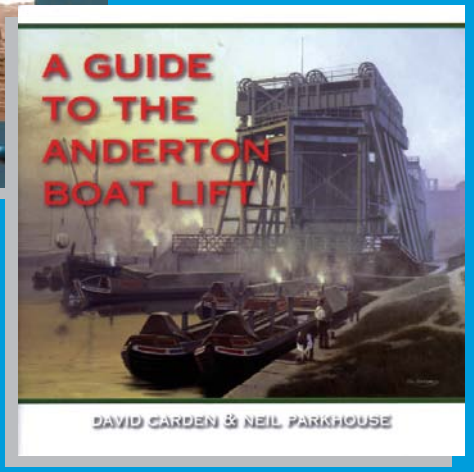
David Carden's book The Anderton Boat Lift is a great buy for anyone who really wants to find out all the details! Superbly illustrated with historic photographs, drawings and maps, the book is a fascinating read.



The Anderton Boat Lift book by David Carden



Cathedral of the Canals DVD



Souvenir guide book